

**REQUEST FOR FILE WRAPPER CONTINUING APPLICATION UNDER 37
CFR 1.62**

DOCKET NUMBER	ANTICIPATED CLASSIFICATION OF THIS APPLICATION:		PRIOR APPLICATION SERIAL NUMBER: 08/615,724	DATE: MARCH 14, 1996
OLE-001C3	CLASS	SUBCLASS	EXAMINER: C. CHURCH	ART UNIT: 2506

ASSISTANT COMMISSIONER OF PATENTS
BOX FWC
WASHINGTON, DC 20231

Certificate of Express Mailing

I hereby certify that the attached Response and papers identified herein are being deposited by me with the United States Postal Service "Express Mail Post Office to Addressee" service, Mailing Label No. EM259576249US, under 37 CFR 1.10, on the date indicated below and is addressed to the Assistant Commissioner for Patents, Box FWC, Washington, D.C. 20231

August 27, 1997 By: *Ilidio Cardoso*
Date Ilidio Cardoso

Dear Sir:

This is a Request for filing a ☐ Continuation-in-part ☒ Continuation ☐ Divisional Application under 37 CFR 1.62 of prior application Serial No. 08/615,724 filed on March 14, 1996 Entitled:

By the following named inventor(s).

<u>FULL NAME OF INVENTOR</u>	<u>RESIDENCE ADDRESS</u>	<u>CITIZENSHIP</u>
Oleg Sokolov	28 Rose Lane, Unit #38, Danbury, CT 06811	U.S.A.
	<u>POST OFFICE ADDRESS</u>	
<u>FULL NAME OF INVENTOR</u>	<u>RESIDENCE ADDRESS</u>	<u>CITIZENSHIP</u>
	<u>POST OFFICE ADDRESS</u>	

The above-identified prior application in which no payment of the issue fee, abandonment of, or termination of proceedings has occurred, is hereby expressly abandoned as of the filing date of this new application. Please use all the contents of the prior application file wrapper, including the drawings, as the basic papers for the new application. (NOTE: 37 CFR 1.60 may be used for application where the prior application is not to be abandoned.)

- ☐ Enter the amendment previously filed on _____ under 37 CFR 1.116 but unentered, in the prior application.
- ☒ A preliminary amendment is enclosed.

The filing fee is calculated on the basis of the claims existing in the prior application as amended at 1 and 2 above.

	NUMBER OF CLAIMS FILED		ALLOWED CLAIMS	NUMBER EXTRA
TOTAL	16	MINUS	20	= 0
INDEP.	5	MINUS	3	= 2
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIMS				
BASIC FILING FEE				

RATE Small Entity	FEE
x 11 =	\$
x 40 =	\$ 80.00
x 130 =	\$
+385 =	\$ 385.00
TOTAL	\$ 465.00

RATE Large Entity	FEE
x 22 =	\$
x 80 =	\$
x 260 =	\$0
+ 770 =	\$
TOTAL	\$

3. ☒ The Commissioner is hereby authorized to charge any additional fees under 37 CFR 1.16 and 1.17 which may be required, or credit any overpayment, associated with this communication, to Deposit Account No. 12-0080. For this purpose a duplicate of this document is enclosed.
4. ☒ A check in the amount of \$ 465.00 is enclosed.
5. ☐ A new oath or declaration is included since this application is a continuation-in-part which discloses and claims additional matter.
6. ☒ Amend the specification by inserting before the first line the sentence:
--This application is a continuation of application Serial No. 08/615,724 filed on March 14, 1996
Entitled: CELLULAR X-RAY GRID
7. ☐ A verified statement claiming small entity status was filed in the parent application Serial No. 08/615,724 and is still deemed proper, and its benefit under 37 CFR 1.28(a) is hereby claimed.
8. ☐ The prior application is assigned of record to: ; recorded , Reel , Frame ;
9. ☒ The power of attorney in the prior application is to: LAHIVE & COCKFIELD, LLP
10. ☒ A request for a 2 month extension of time has been submitted in the parent application Serial No. 08/615,724 in order to establish copendency with the present application (a copy of the request for extension is enclosed).
11. ☐ Also enclosed:

Address all future communication to:
(May only be completed by applicant or attorney or agent of record.)

Customer No. 000959, whose address is:
LAHIVE & COCKFIELD, LLP
Attn: Thomas J. Engellenner, Esq.
28 State Street
Boston, MA 02109

It is understood that secrecy under 35 U.S.C. 122 is hereby waived to the extent that if information or access is available to any one of the application in the file wrapper of a 37 CFR 1.62 application be it either this application or a prior application in the same file wrapper, the Patent and Trademark Office may provide similar information or access to all the other applications in the same file wrapper.

8/27/97
Date

☐ Inventor(s)

Lawrence E. Monks, Esq., Reg. No. 34,224
☒ Attorney or Agent of Record

PTO Form 3.54

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Oleg Sokolov

Serial No.:

Filed: August 27, 1997

For: A CELLULAR X-RAY GRID

Attorney Docket No.: OLE-001C3

Group Art Unit: 2506

Examiner: C. Church

Box FWC
Assistant Commissioner for Patents
Washington, DC. 20231

PRELIMINARY AMENDMENT

Dear Sir:

This paper is a Preliminary Amendment to be entered before examination in the File Wrapper Continuation of s.n. 08/615,724, which is filed herewith.

IN THE CLAIMS

Please amend the claims as follows.

29. (amended) A cellular X-ray grid for use in an X-ray imaging system with a radiation point source and an X-ray film, comprising:

a grid, including a main part surrounded by a [monolithic solid] frame having a height corresponding to the height of the main part and a width selected to prevent bending of said grid and having at least one longitudinally-extending side, and a layer of radiation absorbent material completely covering and overlying all surfaces of said grid including said main part [of] and frame, said main part including a top face and a bottom face, and a multiplicity of throughbores formed therethrough extending from said top face to said bottom face and defining cells to pass radiation emitted by said point source through said main part to form an X-ray image on an X-ray film underlying said grid, said cells are separated by a plurality of x-ray

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diagonals disposed at such a predetermined [oblique] angle not parallel or perpendicular to said longitudinally-extending side of said main part so as to eliminate shadow images of the cells on an X-ray image on the film during exposure thereof [to] from the radiation point source [during] with movement of said grid in a predetermined rectilinear direction, with said longitudinally-extending side of said main part being oriented parallel to said direction of movement.

30. A cellular X-ray grid according to Claim 29, wherein said cells have longitudinal axes extending normally to said top and bottom faces of said main part.

31. A cellular X-ray grid according to Claim 29, wherein said cells have longitudinal axes which radially extend toward a focal point.

32. A cellular X-ray grid according to Claim 29, wherein said main part is photosensitive glass.

33. (amended) A cellular X-ray grid comprising a main part and having two opposite end surfaces consisting of a top surface and a bottom surface and a peripheral surface said main part [consisting of a low x-ray absorbing material] being provided with a plurality of X-ray transmissive cells filled with gas or vacuum, said cells extending through said main part from one of said end surface to another of said end surface and separated by a plurality of x-ray absorbing partitions each having side surfaces facing a respective one of said cells and also each having two opposite end surfaces.

34. A cellular X-ray grid as defined in Claim 33, wherein said main part has a frame adjoining said peripheral surface.

35. (amended) A cellular X-ray grid as defined in Claim 33, wherein [said low x-ray absorbing material of] said main part is photosensitive glass.

36. A cellular X-ray grid as defined in Claim 33 wherein a X-ray absorbing layer completely covers all surfaces of said grid including said partitions and all surfaces of said frame.

37. A cellular X-ray grid as defined in Claim 33, and further comprising two plates connected to said main part at opposite end surfaces of said main part to cover and seal said main part, said plates being composed of a material capable of transmitting a long-wave component of X-ray radiation.

38. A cellular X-ray grid as defined in Claim 37, wherein said cells are vacuum sealed.

39. A cellular X-ray grid as defined in Claim 37, wherein said cells contain a sealed gas.

40. A cellular X-ray grid as defined in Claim 33, wherein said main part has two opposite longitudinal sides, said cells on a view from at least one of said end surfaces having two opposite sides each inclined relative to at least one of said longitudinal sides of said main part at one of the following Mattsson angles:

$$\tan \alpha_1 = 1/31 + 3i$$

$$\tan \alpha_2 = 1/21 + 2i;$$

$$\tan \alpha_3 = 1/1 + i;$$

$$\tan \alpha_4 = 21 + i/1 + i;$$

$$\tan \alpha_5 = 31 + 2i/1 + i;$$

$$\tan \alpha_6 = 21 + i/21 + 2i;$$

$$\tan \alpha_7 = 1 + i/31 + 2i;$$

$$\tan \alpha_8 = 1 + i/21 + i;$$

$$\tan \alpha_9 = 1 + i/1;$$

$$\tan \alpha_{10} = 21 + 2i/1;$$

$$\tan \alpha_{11} = 31 + 3i/1$$

$$\tan \alpha_{12} = 21 + 2i/21 + i$$

wherein 1 is a thickness of each of said partitions in a direction perpendicular to sides of said partitions of two neighboring cells, and i is a length of said side of each of said cells; and $\alpha_1 - \alpha_{12}$ is an angle of inclination of said sides of cells to the intended direction of motion which is parallel to the longitudinal side of said grid, and means for moving said main part in a predetermined rectilinear direction, said at least one longitudinal side of said main part extending

parallel to said direction so that said opposite sides of said cells are inclined to said direction of movement at one of said Mattsson angles.

41. (amended) A cellular X-ray grid comprising a main part [consisting of a photosensitive glass material and] having two opposite end surfaces consisting of a top surface and a bottom surface and a peripheral surface and provided with a plurality of X-ray transmissive cells filled with gas or vacuum, said cells extending through said main part from one of said end surfaces to another of said end surfaces and separated by a plurality of X-ray absorbing partitions each having side surfaces facing a respective one of said cells and also each having two opposite end surfaces, [said main part having two opposite longitudinal sides], and both opposite surfaces being covered by plates for covering and sealing said cells and being composed of a material capable of transmitting a long-wave component of x-ray radiation. [and x-ray absorbing layer completely covering all surfaces of said grid including partitions, said grid has at least one longitudinally-extended side, said cells having diagonals disposed at such a predetermined angle not parallel or perpendicular to said longitudinally-extending side of said main part so as to eliminate shadow images of the cells on an x-ray image].

42. (amended) A cellular grid as defined in Claim [41] 45, where said cells on a view from at least one of said end surfaces having two opposite sides each inclined relative to at least one of said longitudinal sides of said main part at one of the following Mattsson-angles:

$$\tan \alpha_1 = 1/31 + 3i$$

$$\tan \alpha_2 = 1/21 + 2i;$$

$$\tan \alpha_3 = 1/1 + i;$$

$$\tan \alpha_4 = 21 + i/1 + i;$$

$$\tan \alpha_5 = 31 + 2i/1 + i;$$

$$\tan \alpha_6 = 21 + i/21 + 2i;$$

$$\tan \alpha_7 = 1 + i/31 + 2i;$$

$$\tan \alpha_8 = 1 + i/21 + i;$$

$$\tan \alpha_9 = 1 + i/1;$$

$$\tan \alpha_{10} = 21 + 2i/1;$$

$$\tan \alpha_{11} = 31 + 3i/1$$

$$\tan \alpha_{12} = 21 + 2i/21 + i$$

wherein 1 is a thickness of each said partitions in a direction perpendicular to sides of said partitions of two neighboring cells, and i is a length of said side of each of said cells; and $\alpha_1 - \alpha_{12}$ is an angle of inclination of said sides of cells to the intended direction of motion which is parallel to the longitudinal side of grid, and means for moving said main part in a predetermined rectilinear direction, said at least one longitudinal side of said main part extending parallel to said direction so that said opposite sides of said cells are inclined to said direction of movement at one of said Mattsson angles.

cancel 43.

44. (amended) A cellular X-ray grid comprising a main part having two opposite end surfaces consisting of a top surface and a bottom surface and a peripheral surface and provided with a plurality of X-ray transmissive cells filled with gas or vacuum, said cells extending through said main part from one of said end surface to another of said end surface and separated by a plurality of x-ray absorbing partitions each having side surfaces facing a respective one of said cells and also each having two opposite end surfaces and a X-ray absorbing layer completely covering all surfaces of said grid including said partitions.

45. (new) A cellular X-ray grid comprising a main part having a top surface and a bottom surface [two opposite surfaces] and a peripheral surface and provided with a plurality of X-ray transmissive cells filled with gas or vacuum, said cells extending through said main part from one of said end surfaces to another of said end surfaces and separated by a plurality of X-ray absorbing partitions each having side surfaces facing a respective one of said cells and also each having two opposite end surfaces, an x-ray absorbing layer completely covering all surfaces of said grid including partitions, said grid has at least one longitudinally-extended side, said cells having diagonals disposed at such a predetermined angle not parallel or perpendicular to said longitudinally-extending side of said main part so as to eliminate shadow images of the cells on an x-ray image on the x-ray film during exposure thereof from the radiation point source with movement of said grid in a predetermined rectilinear direction, with said longitudinally-extending side of said main part being oriented parallel to said direction of movement

REMARKS

These remarks are made in support of the newly amended claims that are submitted herewith in light of the art that was cited and applied in the parent cases corresponding to this application. The principle references that were applied are Caldwell (U.S. patent 1,208,474), Albert (U.S. patent 4,288,697), Millenaar (U.S. patent 2,336,026), and a publication by O. Mattsson from "Acta Radiologica 1955", Suppl. 120, pages 85 - 153. A discussion of each follows.

Caldwell

The Caldwell reference discloses an x-ray grid that is composed of thin strips of lead (an x-ray absorbent material) having cells for the transmission of the x-rays that are oriented such that the diagonals of the cells are preferentially parallel or perpendicular to the sides of the grid.

The Office has rejected the claims prior to this amendment, claims 29 - 32 and as being anticipated or obvious in light of Caldwell stating that it would have been at least obvious for one to cover the main body of Caldwell with a x-ray absorbent layer to "eliminate x-ray scattering therefrom".

Applicant fails to understand the motivation to cover the *x-ray absorbent* grid of Caldwell with *another x-ray absorbent layer* . Applicant points out that the grid of Caldwell is *already* constructed of a x-ray absorbent material, namely *lead*. Covering the Caldwell grid with a further x-ray absorbent material suggests no additional beneficial properties to the combination. *It adds insignificant strength, since x-ray absorbent materials do not possess the stability and strength, required to stabilize the grid. It does not make it more absorbent. It is already absorbent.*

In a telephone interview with Examiner Church, the Examiner in charge of the prior applications, it was suggested that the grid of Caldwell was formed by layering the strips of lead on top of each other to form a laminate structure. It was suggested by the Examiner that each layer of the laminate (lead strips) could individually be considered a main body and another layer of the laminate (again a lead strip) be considered the x-ray absorbent covering. In response to

this suggestion, applicant and applicant's attorney have reread the Caldwell reference very carefully and can find *no* teaching that Caldwell's grid is formed in a stacked or laminate structure. The grid is composed of a *single* layer of lead strips. In contrast, applicant's claims recite in claims 29, 44, and 45 (independent claims) that applicant's grid is a two layer structure, having a main part and an x-ray absorbing layer.

Applicant's claims recite that the x-ray transmissive cells are filled with gas or are vacuumed. Caldwell, on the other hand, is silent regarding the composition of the cells for transmitting the x-rays other than to suggest that they be filled with a binding material such as bakelite or the like. To suggest that "or the like" implies that the cells are air filled is tenuous. The disclosure of Caldwell clearly does *not suggest or imply* that the cells are filled with a gas or vacuumed because it is *silent* on the matter. The currently amended claims clearly distinguish over the Caldwell teaching's in that they recite that the transmissive cells are *filled with a gas or a vacuum*.

Albert

The Albert reference teaches an x-ray grid that is composed again of a laminate. The laminate is however a combination of an x-ray opaque material and an x-ray transmissive material. Unlike the instant invention, the x-ray transmissive material completely covers the x-ray transmissive cells. In the current invention and as claimed, the cells extend completely through the structure. In Albert, staggered layers of x-ray transmissive material exist within the cells.

Millenaar

The Office has previously rejected claims 37 - 39 under 35 U.S.C. 103, as being unpatentable over Caldwell in light of Millenaar. The Office states that while Caldwell does not disclose a grid having a covering, Millenaar does disclose a cover for a grid. It would thus be obvious for one to cover the grid of Caldwell with a cover as disclosed by Millenaar.

In addressing the Millenaar rejection, applicant incorporates into this response the previous comments as pertaining to Caldwell. Specifically, applicant points out that Caldwell does not teach a main body, including a frame, which are fully enclosed by an x-ray absorbent material. Further, while Millenaar discloses a cover for his linear grid, he does so in the context of the manufacture of a composite material from which an x-ray grid may be constructed. He does not teach or even suggest, as the claims recite, that the cover designed to enclose layers of the grid material also *cover and seal the cells* provided in the main body of a grid in order to give additional structure to the grid, and also seal the cells to contain either a gas or sustain a vacuum therein.

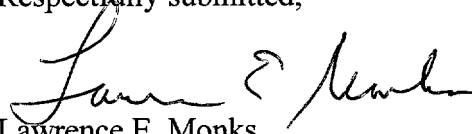
Mattsson

Claims 40 and 42 were rejected as being obvious over Caldwell in light of the Mattsson reference. The Office submits that it would have been obvious to fabricate the grid as taught by Caldwell with partitions angled as described in Mattsson to achieve greater performance.

Applicant initially points out that claims 40 and 42 are dependent claims that depend on claims 33 and 41 respectfully. Consequently, applicant incorporates herein the arguments previously put forth to address and traverse the obviousness rejection of these independent claims. Further, applicant points out that in the present application the cells are angled oblique to one edge of the grid so that simple rectilinear motion parallel to that edge causes the cells to move at the Mattsson angles. In contrast, Mattsson describes a *conventional grid* with the cells having sidewalls parallel to the edges of the grid. This conventional grid is then moved in manner so that the cells have a trajectory over a patient in agreement with the Mattsson angles. In the instant invention the cells are formed so that the trajectory of the radiation source over the cells is in compliance with the angles of Mattsson, when the grid is moved parallel to the longitudinal axis of the grid. In the Mattsson reference, the cells are formed so that the sides of the cells are parallel to the sides of the grid, and consequently the grid must be moved in a motion that is not parallel to the longitudinal side of the grid to satisfy the angles of Mattsson.

Applicant submits that the claims are in a condition for allowance and respectfully requests that same. Applicant's attorney would welcome a telephone interview with the Examiner if he believes that would expedite prosecution of the application.

Respectfully submitted,



Lawrence E. Monks
Attorney for Applicant
Reg. No. 34,224

Lahive & Cockfield, LLP
28 State Street
Boston, MA 02109
tel: (617) 227-7400
fax: (617) 742-4214

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